#28 4/27/04 Mollisk 2813

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

THEODORE W. HOUSTON

Serial No. 09/346,436 (TI-21004)

Filed July 1, 1999

For: BONDED SOI WITH BURIED INTERCONNECT TO HANDLE OR DEVICE WAFER

Art Unit 2813

Examiner E. Kielin

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4-21-04

Jay M. Cantor, Reg. No. 19,906

REPLY BRIEF

Sir:

The continued rejection of claims other than those on appeal is not understood, especially in view of the Decision on Petition. Accordingly, only the claims on appeal will be discussed, these claims being claims 9 and 22. Claims 25 and 26 have been indicated to be allowable if written in independent form.

It is again noted that the rejection of claims 9 (which includes claim 7) is under 35 U.S.C. 102(b) as being anticipated by Hayashi (5,087,585). Accordingly, it is incumbent

that the Hayashi patent teach each and every step in the order claimed and each and every function of each step of claim 9. This is not the case as will again be demonstrated.

This is not the case for claim 9 which requires that the electrical interconnect structure in the electrically insulating layer contact both the device layer and the substrate and, as stated in claim 9 "form an electrical interconnect structure in said electrically insulating layer, said interconnect structure contacting both said device layer and said substrate" (underline not in original). The fact that the interconnect is disposed within the electrically insulating layer is important as shown in Figs. 1, 2 and 3 of the subject application. This arrangement of placing the interconnect structure "in" the electrically insulating structure permits high selectivity in interconnecting regions of the device layer and the substrate both directly through the electrically insulating layer as well as within the electrically insulating layer as shown, for example, in Fig. 3.

The interconnect structure of Hayashi is the metal pool which is not disposed in the electrically insulating layer and therefore there can be no interconnect in the electrically insulating layer of Hayashi which contacts both the device layer and the substrate. Furthermore, as stated in Hayashi at column 4, lines 25ff:

- "Thereafter, the first layer thin film device 22 and the second layer thin film device 23 are bonded to each other until the refractory metal bump 13 formed on the first layer thin film device 22 cuts into and electrically contacts with the non-refractory metal pool 18 formed on the undersurface of the second layer thin film device 23, as shown in FIG. 2C. In this bonding process, the devices are heated to a temperature higher than the melting point of the metal embedded as the nonrefractory metal pool 18..."
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Since there is no adhesive to bond the first device layer 22 and the second layer thin film device 23 to the insulative layer 17, the only source of adhesion of the layer 22 and

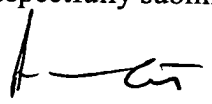
device 23 to the layer 17 must be from the metal pool 18 and the bump 13. It follows that there is no "bonding said planar surface of said electrically insulating layer to said overlying one of said substrate and said device layer" as required by the claim.

With reference to claim 22, this claim requires the feature of bonding as discussed above with reference to claim 9 and which is nowhere taught by Hayashi either alone or in the total combination as claimed.

With reference to the feature of breakdown of the native oxide, while it is known in the prior art to perform such a function, it is not known to perform such a function in the context of the present invention. In accordance with the present invention, any native oxide which requires removal will be disposed internally of the final device as depicted in Figs. 1 to 3. Accordingly, the step of causing breakdown of any native oxide formed internally of the final device after bonding is not obvious.

For the reasons stated above as well as in the Brief on Appeal, reversal of the final rejection of claims 9 and 22 is urged that justice be done in the premises.

Respectfully submitted,



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